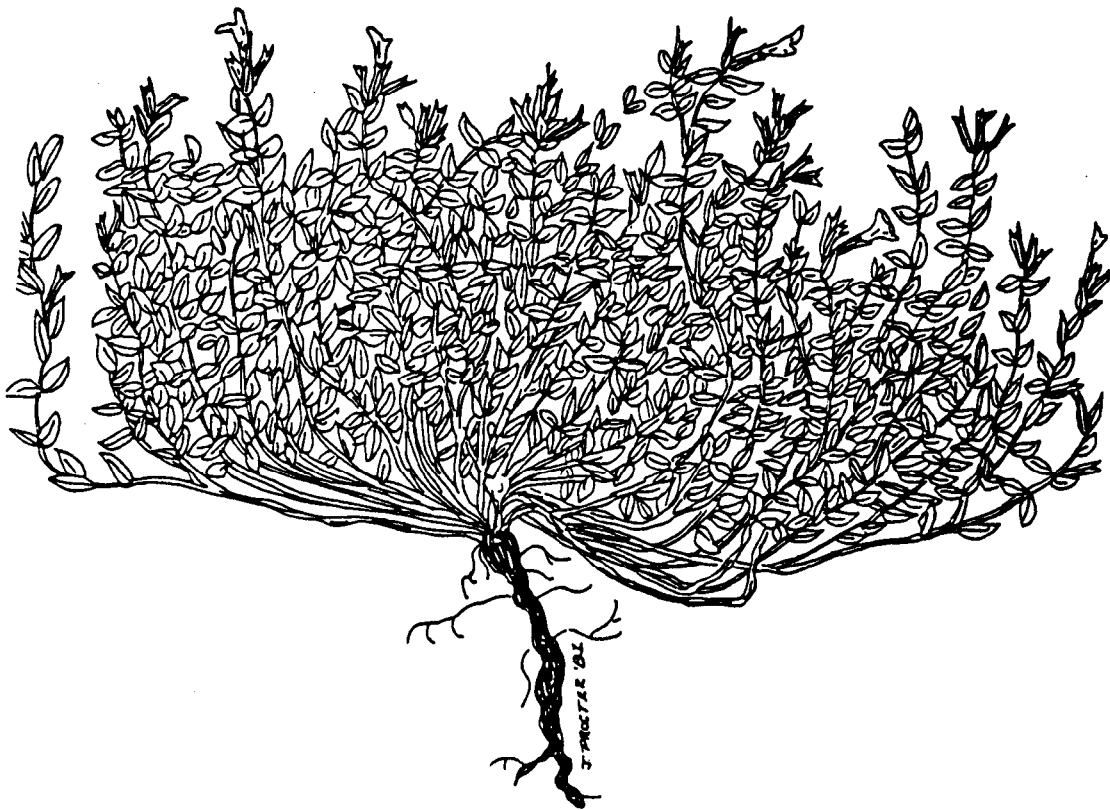


# MCKITTRICK PENNYROYAL

(Hedeoma \_\_\_\_ apiculatum)

## RECOVERY PLAN



U.S. FISH & WILDLIFE SERVICE  
ALBUQUERQUE, NEW MEXICO

1985

**McKITTRICK PENNYROYAL**

Bedeoma apiculatum W.S. STEWART

**RECOVERY PLAN**

Prepared by:

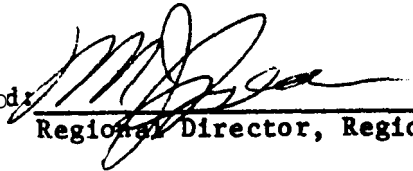
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Approved: 

**Regional Director, Region**

2

Date: 

## DISCLAIMER

This is the completed **McKittrick** Pennyroyal Recovery Plan. It has been approved by the U.S. Fish and Wildlife Service. It does not necessarily represent official positions or approvals of cooperating agencies and it does not necessarily represent the views of all individuals who played key roles in preparing this plan. This plan is subject to modification as dictated by new findings and changes in species status and completion of tasks described in the plan. **Goals** and objectives will be attained and funds expended **contingent** upon appropriations, priorities, and other budgetary **constraints**.

Literature citation should read as **follows**:

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## SUMMARY

GOAL : To remove **McKittrick** pennyroyal from the Federal list of endangered and threatened species by managing the essential habitat to sustain natural populations in the wild.

RECOVERY CRITERIA: The criteria for delisting **McKittrick** pennyroyal have not yet been determined. The implementation of **management measures** and **s** studies specified in this recovery plan will provide the necessary data from which quantified **delisting** criteria can be **established**.

ACTIONS NEEDED: The major steps needed to meet the recovery criteria include: removing threats by **working** with the National Park Service, U.S. Forest Service, and USDI Bureau of Land Management to enforce existing regulations and develop management plans; initiating and supporting studies on population biology and ecology; and developing public awareness, appreciation, and support for preservation of **McKittrick** pennyroyal.

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## PART I

### INTRODUCTION

**McKittrick** pennyroyal, Hedeoma apiculatum **W.S.** Stewart, was listed as a threatened species on July 13, 1982 (47 FR **30440**), and critical habitat was designated for some of its populations. Several other related **taxa** also occur in low numbers and are listed or are candidates for listing under the Federal Endangered Species Act (ESA). Hedeoma todsenii is listed as endangered. Hedeoma pilosum and Hedeoma graveolens are included in categories 2 and 1, respectively, in a 1980 notice of review of plant **taxa** for listing as endangered and threatened species and a 1983 supplement (45 FR 82480, 48 FR 53640).

**McKittrick** pennyroyal is known only **from** the Guadalupe Mountains of Texas and New Mexico. The majority of known populations, and largest populations , occur in Guadalupe Mountains National Park, Texas, administered by the National Park Service (NPS). Three other population<sup>8</sup> exist outside the park in New Mexico--one each on Lincoln National Forest, private **lands**, and land administered by the Bureau of Land Management (**BLM**).

The populations are presently stable, but the **slowly** reproducing plants are potentially threatened by activities of park **visitors**, by future park development, and by possible mining or road construction within Lincoln National Forest and on BLM land. On BLM and private land threat<sup>8</sup> are grazing by domestic sheep and exotic auodad sheep, and possible damage from soil erosion and/or flooding of some areas.

The objective of this recovery plan **is** to protect the plants and their habitat . Part I of the plan contains biological information on

the McKittrick pennyroyal and a description of the threats to its continued existence. Part II outlines and describes steps necessary to protect and recover the **species**. Part III lists recovery tasks **along** with recovery priority ratings, agencies involved, and **costs** for U.S. Fish and Wildlife Service (FWS) tasks.

### Taxonomy

McKittrick pennyroyal was first collected by V. Harvard in 1882. Although it was collected occasionally after 1882, it remained undescribed until 1939, when it was described by William **S. Stewart** in a review of Hedeoma and allied genera (**Epling** and Stewart 1939). The Holotype, now deposited at LA,\* was collected in "sunny crevices along stream, McKittrick Canyon" by Moore and Steyermark (No. **3563**), August 22, 1931. Isotypes have been deposited at CAS, DS, GH, MICH, NY and **PH** (Irving 1980a).

Hedeoma apiculatum is a member of the **subgenus** Ciliatum, a group of morphologically **distinct**, narrowly restricted **endemics**. As a group, Ciliatum is thought to be an ancient line within Hedeoma. Hedeoma apiculatum is a polyploid species, its somatic or diploid **chromosome** number, **2n** = 144, is the second highest in the Lamiaceae (the mint family). It is most closely related to Hedeoma todsenii, an endangered endemic of the San **Andres** Mountains, New Mexico.

---

\*LA   = University of California at Los Angeles  
 CAS   = California Academy of Sciences  
 DS    = Stanford University  
 GH    = Harvard University  
 MICH  = University of Michigan  
 NY    = New York Botanical Garden  
 PH    = Academy of Natural Sciences of Philadelphia



### Morphology

McKittrick pennyroyal is a **long-lived** perennial herb forming dense tufts from woody **rootstocks**. Leaves are opposite, thick, small, and lance-shaped, 0.1 to 0.2 in. (0.25 to 0.5 cm) wide, 0.3 to 0.6 in. (0.8 to 1.5 cm) long, margins without teeth, and tips pointed. **Flowers** are in **clusters** Of **1-3**. The calyx is 0.5 in. (1.3 cm) long, tubular to funnel shaped; calyx teeth are lance-like in two sets. The corolla **is** of five united petals, two-lipped, 0.75 in. (1.9 cm) long, and pink colored. The fertile stamens are two; the fruit is of four **nutlets**, and sticky when wet.

McKittrick pennyroyal is distinguished from related species by its tufted habit; its thick, pointed, entire leaves; and its showy pink corolla. It differ8 from H. todsenii by the latter's smaller lavender Corolla, shorter calyx, apiculated leaves, and included anthers.

### Distribution

McKittrick pennyroyal is known only from the semi-arid Guadalupe Mountains of Culberson County, **Texas**, and Eddy County, New Mexico. Nine major population8 are known in an area of approximately 12 **mi**<sup>2</sup> (40 **km**<sup>2</sup>). Six of these are within Guadalupe Mountain8 National Park; one occurs **just** outside the park's boundary in Lincoln National **Forest**; one occurs on private land in Big Canyon, New Mexico; and one occurs in Big Canyon on land adminieted by BLM. Table 1 lists specific localities. Figure 1 show8 the critical habitat which covers only three of the populations.

TABLE 1  
PRECISE OCCURRENCES OF  
HEDEOMA APICULATUM

Localities (Collections/Observations)	Current Status
1. Texas: <b>Culberson</b> Co., GMNP, <b>Devils</b> Den, 1355-1800 m (1 collection & 3 observations by <b>Mr.</b> T.L. Burgess, 1974-76).	Small, undisturbed population along a .72 km section of canyon. Included in critical habitat.
2. Texas: Culberson Co., GMNP, South McKittrick Canyon including lower portions of "canyon to bowl," 1700-1800 m (ca. 15 collections & numerous observations).	Largest and best known population (several hundred plants) spanning 1.6 km section of canyon along trail. Included in critical habitat.
3. Texas: Culberson Co., GMNP, above Turtle Rock on cliffs, 2160-2232 m (1 collection by T.L. <b>Burgess</b> , 1973, and several observations, 1976-79).	Small population of 50-100 individuals on Turtle Rock and cliffs near McKittrick ridge trail. Included in critical habitat.
4. Texas: <b>Culberson</b> Co., GMNP, Pine Top (Hunter Peak) drainage, 2232-2592 m (2 collections, 1947-48; 3 <b>observations</b> , 1979; & detailed population count, 1982).	Population of over 100 individuals on summit.
5. Texas: <b>Culberson</b> Co., GMNP, Bear Canyon, 2160 m (1 observation, 1979).	Population consists of three plants on face of a boulder on Bear Canyon Trail.
6. <b>Texas:</b> Culberson Co., GMNP, East Rim, approximately 2438 m (surveyed by Doug Buehler, July 1984).	Population of 150-200 plants, covering an area approximately 1.5 km long on the east rim.
7. New Mexico: Eddy Co., Lincoln N.F., North McKittrick Canyon, 1798 m (1 collection by Dr. <b>Northington</b> , 1974).	Not seen by author, label data indicates scarce on alluvium above roadway.
8. New Mexico: Eddy Co., Big Canyon (private land), 1567 m (1 collection, Dr. <b>Dunford</b> , 1976).	Not seen by author, size unknown but believed to be less than 100.
9. New Mexico: Eddy Co., Big <b>Canyon</b> (BLM administered land), 8.36 km (surveyed by Jesse Juen, <b>BLM</b> , August 1983).	Estimated that there were over 200 plants.
Total: These nine <b>localities</b> are scattered over approximately 40 km <sup>2</sup> .	Total number of plants is estimated to be less than 1,500.

# McKITTRICK PENNYROYAL

Culberson County, TEXAS

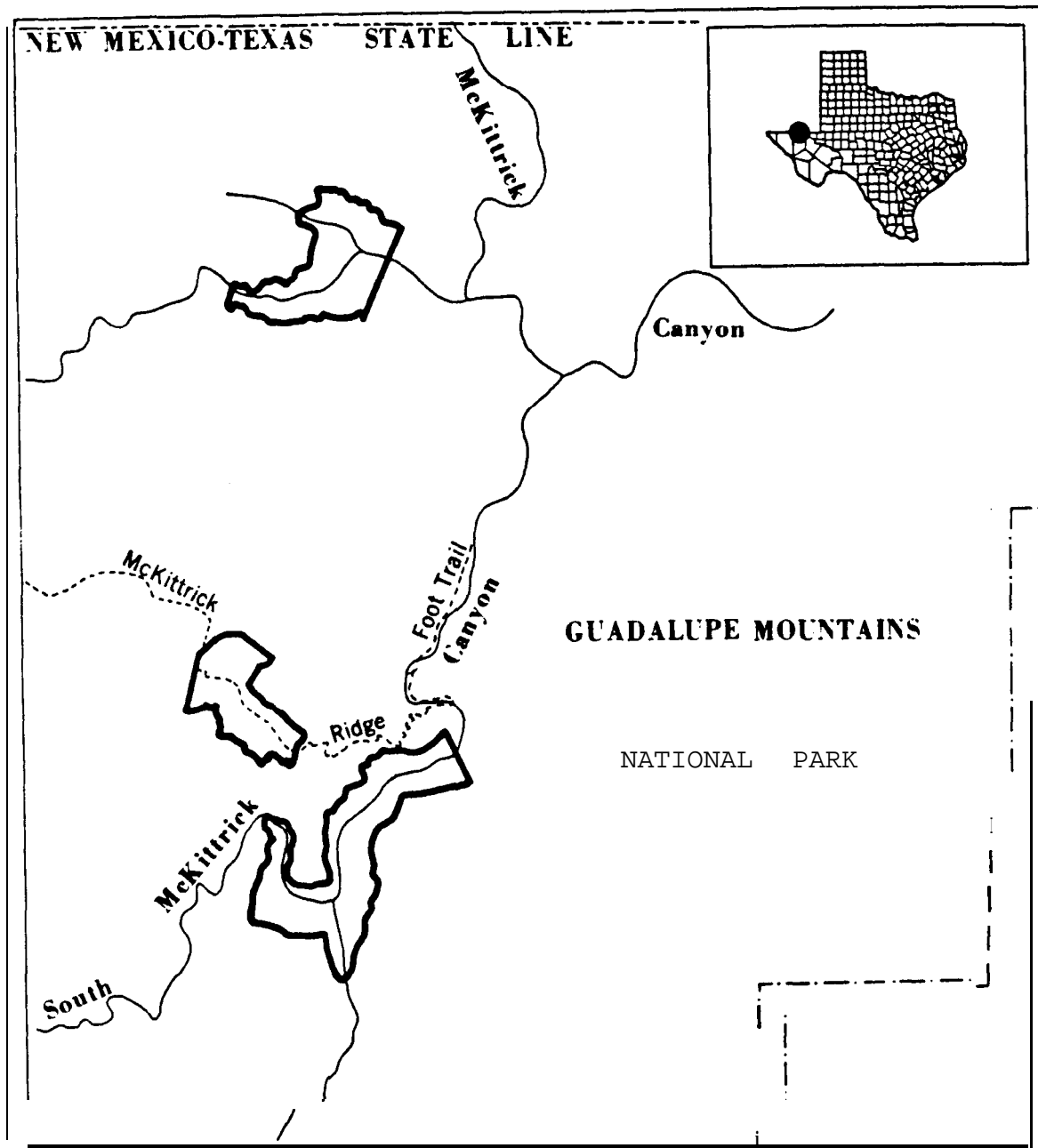


Figure 1. Critical habitat of McKittrick pennyroyal.

At the time McKittrick pennyroyal was listed in 1982, six population<sup>8</sup> were known with four of them in the park. Critical habitat was declared for park areas that included the three largest and best known populations. Since the **listing**, two additional park population<sup>8</sup> and one population on **BLM** land have been discovered. Tasks are presented in this plan to determine if additional critical habitat areas should be proposed.

The range of McKittrick pennyroyal lies within the Sacramento Mountains Section of the Basin and **Range** Province (Hunt 1967). Rainfall averages 21 in. (53.3 cm) per year, and the frost-free season averages 275 days. The plants occur from 5500 f t (1660 m) to 8400 f t (2550 m) in elevation.

#### Habitat

McKittrick pennyroyal is restricted to open limestone rock surfaces within the Madrean Evergreen Woodland Biotic Community (Brown and Lowe **1980**). Large boulder<sup>8</sup> and limes tone ledges of protected canyon<sup>8</sup> support the largest populations. The species **is** also found on steep limestone **faces** and ledges at higher elevations, 7085 to 7380 ft (2160 to 2250 m). While the rock surfaces that support colonies of McKittrick pennyroyal are usually exposed, they also provide a measure of protection from excessive desiccation.

**Associated** plant<sup>8</sup> are Similarly restricted, and **many** are **endemic** to the area:

**Aquilegia** chaplinei

columbine

Pinaropappus **parvus**

no common name

<u>Perityle quinqueflora</u>	rock daisy
<u>Ghaetopappa hersheyi</u>	no <b>common</b> name
<u>Nama xylopodum</u>	no common name
<u>Selaginella pilifera</u>	resurrection plant
<u>Petrophytum caespitosum</u>	rock-s pi <b>raea</b>
<u>Philadelphus hitchcockianus</u>	<b>no</b> ck-orange

### Population Biology

Hedeoma apiculatum is known from nine general localities scattered **over** approximately a 15.4 **mi**<sup>2</sup> (40 **km**<sup>2</sup>) area. In 1981, all planned future trail **corridors** in Guadalupe Mountains National Park were searched for additional populations, and none were found. The most recently discovered population was found on the east rim of the park by Doug Bueler (**NPS**) in July 1984. It is anticipated that additional localities may be found in some of the more **inaccesssible** regions of the Guadalupe Mountain Range. The **number** of individual plants per population ranges from three in the Bear **Canyon** drainage to several hundred at the largest concentration in South McKittrick Canyon. The density of plants is low, even at the South McKittrick Canyon locall **ty**. Seldom are there more than two or three plants per 1076 **ft**<sup>2</sup> (100 **m**<sup>2</sup>). The total number of plants from all known **localities** is estimated to be less than 1,500.

Most plant growth for McKittrick pennyroyal **occurs** during the spring and summer--the period of highest rainfall in the Guadalupe region. With normal rainfall patterns, flowers will be produced in July, and

flowering will continue until fall. First-year plants typically produce very few flowers; older plants may produce as many as 100 flowers. The flowers will remain open for several days, but wither quickly after pollination. The **nutlets** require approximately 3 **weeks** to mature. In late summer and fall, young **overwintering shoots** emerge **from** the trailing woody **roots** **stocks**. The thick woody roots **stocks**, and field observations by the author between 1966 and 1979, indicate that McKittrick pennyroyal is a long-lived perennial.

McKittrick pennyroyal is primarily outbreeding, but is also capable of self-pollination. Seeds may be transported by water or wind. Within minutes after being **moistened**, the seed coat become8 mucilaginous and quickly adheres to a **substrate**. **Calyces** containing seeds may also abscise and **serve** as the dispersal vehicle.

A mature McKittrick pennyroyal plant averages 75 flowers per growing season with an average yield of one viable seed per flower. Seeds remain viable up to 5 years. They require no dormancy period or other special pretreatment8 for germination. Germination in the laboratory is approximately 50 percent.

Little is known of the population ecology of McKittrick pennyroyal. Like many members of the genus, it is **sensitive** to competition. Colonies of the species are widely scattered on open rock surfaces and demonstrate little apparent interaction with other species. Seldom **is** McKittrick pennyroyal found on soil or on sites that are at advanced stages in primary succession. Yet in the greenhouse, McKittrick pennyroyal can be grown **successfully** in a variety of **soil conditions**. We can speculate

that streamways and high, exposed outcrops are favored habitat, since it is here that there are few competing species and succession is either interrupted by seasonal floods or precluded by the vertical aspect of the habitat. McKittrick pennyroyal may also **assist** in reducing competition by its production of monoterpenes, many of which have been **demonstrated** to have allelopathic effects (Irving 1980b).

There is no evidence of natural hybridization, and artificial hybridization has not been attempted. Its unusually high **polyploid** chromosome level ( $2n = 144$ ) suggests that the likelihood of fertile  $F_1$  hybrids resulting from interspecific **crosses** is low.

#### Land Ownership

Most of the known populations of McKittrick pennyroyal occur on public land administered by the National Park Service in Guadalupe Mountain National Park. One population occurs on private land, another on the southern edge of the Lincoln National Forest, and another on BLM administered land.

#### Impacts and Threats

Populations of McKittrick pennyroyal in Guadalupe Mountain National Park and adjacent Lincoln National Forest are relatively well protected from major modification or destruction of habitat. The administration of the national park recognizes the fragile nature of the park's plant and animal communities (National Park Service 1973) and **has** implemented

**some** protective management **strategies**. Moreover, a U.S. **House of Represent-**  
**atives** committee report recommended that there be close cooperation **between**  
the Forest Service and the National Park Service in preserving the  
environmental resources of North McKittrick Canyon and other canyon8 in  
Lincoln National Forest (National Park Service 1973). Yet, the population8  
of McKittrick pennyroyal are potentially threatened. Existing trails  
permit access to most localities of the species; therefore, as trail use  
Increases there is the danger of destruction of local habitat. The plants  
are easily dislodged, and the cumulative impact of hikers leaving the  
trail and climbing over the ledges and boulder8 that support colonies of  
McKittrick pennyroyal could be devastating to the small and slowly reproducing  
populations. Additional ly , the showy and distinctive plants are highly  
visible from the trails and could be **subject** to increased collection.

New trail alignments are planned within the distribution of McKittrick  
pennyroyal. With some modification, these trail alignment8 should not  
threaten the known populations and could actually reduce visitor pressure  
in some areas. Guadalupe Mountain8 National Park **is** relatively new  
and, in all likelihood, will attract an **increasing** number of visitors.  
**During** 1981 the park had approximately 36,411 back-country user days,  
compared to 26,300 in 1978 (National Park Service 1984). Trail counts  
of hikers into the South McKittrick biological area, **a** locality of McKittrick  
pennyroyal, were 323 in 1978 and **more** than 520 in 1979 (Phil Koepp, **NPS,**  
**pers. comm.** 1983). Future increases, as well as the construction of  
additional trails, shelters, or camping areas to accommodate them, could  
potent **ial ly** threaten the survival of pennyroyal populations.



The current status and potential threats to each of the known populations is reviewed below:

Hunter Peak Population: Once thought to contain only a small population, Hunter Peak is now known to contain over 100 individual pennyroyal plants. The plants grow abundantly on the ledges of the **peak's** approach slope, and the largest population is found in the "high country".

The peak is of high interest to hikers in the Bowl, and the existing peak access trail from the Bowl Loop passes through the population. Several plants are in the trail treadway. The trail is unimproved and hikers, especially on their return to the Bowl Loop, often leave the trail and scramble over the rocks and ledges that support the pennyroyal. The plants are easily dislodged by foot traffic so of f-trail use of the area poses the potential for population extirpation at Hunter Peak.

Park planning personnel have considered several alternatives to reduce the visitor impact at Hunter Peak. The currently recommended alternative is to improve the existing access trail and to construct an additional trail segment to create a Hunter Peak Loop. The improvements to the existing access trail would avoid as many of the individual pennyroyal plants as possible. The trail would be improved only to the extent that its route would be clearly defined. The new trail segment would be positioned downslope from the pennyroyal population. The Hunter Peak Loop would **allow** hikers of the Bowl Loop to visit the peak and return to the Bowl Loop ahead of where they departed for Hunter Peak. The new loop should minimize off-trail travel by hikers.

To further protect the Hunter Peak pennyroyal population and other fragile resources, all horse traffic has already been banned from the **peak** area.

McKittrick Canyon Population: The population in the South Fork of **McKittrick** Canyon is the largest and best known of the penny-royal populations. It serves as the basis for the common **name**. The plants are widely scattered in crevices on rocks and large boulders of the canyon floor and on its **mesic** walls. This population also extends into several small side canyons. The canyon **segment** containing pennyroyals **is** 1.0 to 1.2 **mi** (1.6 to 2.0 km long), and estimates of plant density average 25 to 30 plants per 1640 ft (500 m) of canyon.

The portion of the South Fork of McKittrick Canyon **containing** the pennyroyal is identified as a sensitive biological area and contains a variety of unique biological resources. It has an undeveloped trail which is often no more than a series of cairns. In these areas a hiker must scramble over the boulders and ledges of the **streamway**. As a result, the plants are vulnerable to being dislodged and destroyed. Use of the South McKittrick biological area increased **from** 323 in 1978 to 520 in 1979, but decreased after 1980 with construction of the new Turtle Rock Trail. It has since been designated as a Research Natural Area and access is allowed only with a permit (Phil Koepp, NPS, **pers. comm.** 1984).

McKittrick Canyon Trail and Turtle Rock Population: The McKittrick Canyon Trail is the back-country hiking artery of Guadalupe Mountains National Park. As the trail begins to descend into McKittrick Canyon, there is a large and somewhat spectacular rock formation known as Turtle Rock. The trail skirts two sides of this formation at its base.

McKittrick pennyroyal is found on the sheer rock face along the McKittrick Canyon Trail just before the narrow ridge leading to Turtle Rock and on Turtle Rock itself. Many of the Turtle Rock plants grow on ledges along the trail; eight to ten occur in the actual **treadway**. The trail from Turtle Rock to the canyon floor has been reconstructed. Undoubtedly, some of the Turtle Rock population was lost by this work. The McKittrick Canyon Trail has been realigned and McKittrick **pennyroyal** was taken into consideration (Ralph Harris, NPS, **pers. comm.** 1983).

Devils Den Population: Devils Den **is** a somewhat secluded canyon that does not receive a large number of visitors. Presently, there are no trails planned for Devils Den. This area has also been designated as a Research Natural Area and access is by permit only (Phil Koepp, NPS, **pers. comm.** 1984). With no significant increase in visitors and with no trail or facilities construction in the canyon, the Devils Den population should remain stable.

Bear Canyon Trail Population: The Bear Canyon Trail population consists of three plants on the west face of a large boulder in the trail at an elevation of 7321 ft (2232 **m**). Its present status **is** unknown.

East Rim Population: This population occurs on an escarpment on the east side of the park. About 150 to 200 pennyroyals are found in an area that is approximately 0.9 ml (1.5 km) **long**. This area lies in the northern end of an area proposed for open camping. Although the pennyroyals are on a slope too steep for camping, they may still be threatened with trampling from campers climbing **over** the rocks.

Lincoln National Forest Population: The Lincoln National Forest population occurs in North **McKittrick** Canyon just beyond the boundary of Guadalupe Mountains National Park. The plants are scarce in rocky alluvium above the roadway. While there are currently no threats to this population, there is some consideration of exploratory mining for oil and gas. Conceivably, implementation of these plans could impact the population.

Big Canyon Population (private): The Big Canyon population **is** the only known population occurring on private lands. While its size is not **known**, it is believed the population has less than 100 individuals. Presumably the area is grazed and any significant increase in grazing could jeopardize the plants. Similarly, any road construction or major changes in land use could affect the population.

Big Canyon Population (BLM): This population was surveyed in August 1983. Over 160 plants were counted and the total population was estimated to be over 200. These plants were on a steep limestone bluff approximately 120 ft (37 m) high and extending for over 750 ft (229 m) at an elevation of 5080 ft (1548 m) to 5200 ft (1585 m) (Jutn 1983).

This population is threatened with the possibility of damage from seasonal runoff water. Two plants were located at the canyon bottom and several others were **wi** thin flood water levels (Juen 1983). Although the area is too steep for cattle, domestic sheep could use the area. Exotic auodad sheep (Ammotragus lervia **Pallas**) have been sighted in Big Canyon. An increase in sheep could lead to greater use of the canyon resulting in increased erosion or actual consumption of the pennyroyal by sheep (Juen 1983). Mineral development is also a potential threat in this area (**Juen** 1983).

## PART II

### RECOVERY

#### Objective

The main objectives of this recovery plan are to protect Hedotoma apiculatum and its habitat from degradation due to human activities and to maintain, through management, healthy populations in their natural habitat at a level where the species can be delisted. The natural habitat is limited due to the specialized substrate **requirements** of the species. Stabilization of the habitat and elimination of potential disturbances could lead to delisting of the species. With the limited amount of study on this species, the quantification of habitat and abundance necessary for delisting is not possible at this time. Further study of this species will provide data necessary to establish criteria for **delisting**.

The potential threats to the **McKittrick** pennyroyal include; (1) trail construction in Guadalupe Mountains National Park, (2) hiker foot traffic over its fragile rock habitat in Guadalupe Mountains National Park and in Lincoln National Forest, (3) potential trail and facilities development in response to growing visitor interest in the area, (4) potential mining or oil and gas activities in Lincoln National Forest and on BLM land, (5) increased grazing activities, and (6) possible damage from soil erosion and/or flooding of some areas.

Step-down Outline

1. Remove threats to Hedeoma apiculatum.
  11. Work with Federal agencies to ensure enforcement of existing regulations.
  12. Develop a management plan for populations in Guadalupe Mountains National Park.
    121. Increase park personnel awareness of McKittrick pennyroyal.
    122. Complete the Hunter Peak Loop hiking trail.
    123. Post signs stating the ecological sensitivity of the area and encouraging visitors to stay on trails.
    124. Evaluate all future trails or facilities development.
    - 125.** Monitor McKittrick pennyroyal populations.
      1251. Develop permanent sample sites for major populations.
      - 1252.** Monitor and record subsamples from the sample sites.
    126. Protect McKittrick pennyroyal from visitor impact.
      1261. Monitor the number of annual visitors to each population area.
      1262. Establish alternative action plans.
    127. Evaluate the value of **declaring** critical habitat for new park populations.
  13. Develop a management plan for the population in Lincoln National Forest.
    131. Increase Forest Service personnel awareness of McKittrick pennyroyal including location and fragility.

- 132. Post signs near the North **McKittrick** Canyon population.
- 133. Evaluate all future development or land use changes in the steep canyons south of Guadalupe Ridge.
- 134. Monitor the population as described in task 125.
- 135. Evaluate the value of declaring critical habitat for this population.
- 14. Seek cooperation of the private landowner to protect and maintain the Big Canyon population.
  - 141. Increase landowner awareness of **McKittrick** pennyroyal, **including** location and fragility.
  - 142. Monitor the population as described in task 125.
- 15. Develop a **management** plan for the population on BLM land in Big Canyon.
  - 151. Monitor the population as described in task 125.
  - 152. Post signs near the population.
  - 153. Evaluate all future development or land use changes.
  - 154. Monitor grazing.
  - 155. Evaluate the value of declaring critical habitat for this population.
- 2. Gather information for use in management of populations.
  - 21. Review population biology and ecology of the species.
    - 211. Determine the extent of reproduction by seed and overall reproductive success.
    - 212. Study the soil, climate, and microhabitat requirements.



22. Search for additional populations.
  23. Develop techniques to artificially propagate (from seed or vegetatively) and transplant H. apiculatum.
  24. Use information from population studies and from management to establish **delisting** criteria for the **species**.
3. Develop public appreciation and support for the preservation of Hedeoma apiculatum.
31. Increase public knowledgt of the Endangered Species Program and of **McKittrick** pennyroyal.
  32. Obtain support of local public interest groups.

Narrative1. Remove threats to Hedeoma apiculatum.

Threats to this species can be **removed** by enforcement of **existing** regulations and by management of the species and its habitat.

Hedeoma apiculatum has a very limited distribution and needs strict enforcement of protective regulations. **Ef fect ive management** plans art also necessary to prevent future damage to individual plants and their habitat.

11. Work with Federal agencies to ensure enforcement of existing regulations.

These regulations provide for protection of endangered and threatened and/or vulnerable species and include the Endangered Species Act, as amended, the Federal Land Policy and Management Act, and National Park Service and Forest Service directives with respect to endangered species. Making this plant and its locality known to all field personnel of involved agencies would also facilitate Its protection.

12. Develop a management plan for populations in Guadalupe Mountains National Park.

Because the majority of **known** populations and the largest known populations occur in Guadalupe Mountains National Park, it is

imperative that a management plan be developed that includes the following:

121. Increase park personnel awareness of McKittrick pennyroyal.

Park personnel should be trained to identify the species, advised of the location of all known park populations, and made knowledgeable of the plant's habitat requirements and **fragility**. Moreover, park personnel should use such knowledge to periodically observe the condition of existing populations, to detect any adverse impacts to plants or populations and to discover additional populations. Such efforts are in addition to the formal monitoring program. Knowledge of the location of the North McKittrick Canyon population in Lincoln National Forest will enable park personnel **to** avoid sending backpackers into a pennyroyal area.

122. Complete the Hunter Peak Loop hiking trail.

The construction of the Hunter Peak Loop should channel visitor traffic in such a way as to minimize the impact to the Hunter Peak pennyroyal population.

123. Post signs stating the ecological sensitivity of the area and encouraging visitors to stay on trails.

Signs should be posted at/in Hunter Peak, McKittrick Canyon Biological Area, Turtle Rock, the East Rim, and, probably, Devils Den advising visitors of the ecological sensitivity

of these areas and encouraging them to remain on trails. To reduce the possibility of vandalism or collection, signs should not directly identify the plant or indicate exact localities for populations.

124. Evaluate all future trails or **facilities** development.

To avoid potential adverse impacts to **McKittrick** pennyroyal populations, all future trail or facilities developments should be evaluated. Such an evaluation should consider not only the direct or primary impact of construction, but also the indirect or secondary impact of increased area use.

125. Monitor **McKittrick** pennyroyal populations.

Monitoring will help determine the impact of park use on plants and can be used to evaluate the success of management decisions. Periodic **monitoring** should be conducted by resources management personnel at Turtle Rock, Hunter Peak, the **McKittrick** Canyon Biological Area, and Devils Den. The Turtle Rock and Hunter Peak populations should reflect the impact of large numbers of on-trail users, while the Biological Area would reflect light to moderate on and off-trail use. The Devils Den population would serve as a control with very light off-trail **use**.

1251. Develop permanent sample **sites** for major populations.

Each population should be subsampled using permanent **quadrat** or photographic stations.

1252. Monitor and record subsamples from the sample sites.

These subsamples should be taken at the same **time** each year and should include areas of both high and moderate visitor use, as well as controls in areas that are not visited by hikers. In addition, each subsample should include the following: presence or **absence** of individual plant **s**, seedlings, and young plants; individual size of plants; presence of clumps or groups of plants; the number of flowers; evidence of injury (such as yellowing leaves, loss of branches); and other **indicators** of general conditions. Prepare a map or photographic record of the location of individual plants.

126. Protect **McKittrick** pennyroyal from visitor impact.

With increased park use, the possibility of damage to populations by park visitors will increase. A program should be established to monitor park visitation near pennyroyal populations and establish alternatives if adverse impacts from visitors are evident.

1261. Monitor the number of annual visitors to each population area.

If a population begins to show stress or damage, possible correlation with an increase in trail use will be missed in the absence of visitor data. Similarly, observed stress may be unrelated to use, and this too, would be overlooked in the absence of visitor data. Quantified visitor data can also aid development of realistic alternative management strategies. Rather than closing off an area when a plant population begins **to** be affected by visitor traffic, an area might remain open but at a reduced visitor level as determined from the user data base.

1262. Establish alternative action plans.

Early in the planning process the level of observed impact that will prompt alternative action should be set in consultation with FWS. Plans should consider visitor reduction, site closings, and restoration procedures and these plans should be implemented when adverse **impacts** become evident.

127. Evaluate the value of declaring critical habitat for new park populations.

At the **time McKittrick** pennyroyal was listed in 1982, six

population<sup>8</sup> were known with four of them in the park.

Critical habitat **was** declared for park **areas** that included the three largest and best known populations. Now that two additional park populations have been discovered and once all are better **known**, the value of **declaring** critical habitat for all park populations should be evaluated.

The FWS **should** propose critical habitat for these areas if it **is** determined it will benefit the species.

13. Develop a management plan for the population in Lincoln National Forest.

A management plan should be developed for the population in Lincoln National Forest that includes increasing **Forest** Service personnel awareness of McKittrick pennyroyal and informative signs should be posted.

131. Increase Forest Service personnel **awareness** of McKittrick pennyroyal including location and fragility.

All Forest Service personnel, especially field personnel, should be aware of McKittrick pennyroyal. **They** should be trained to identify the species and informed of the plant's habitat requirements and fragility. Moreover, Forest Service personnel should use **such** knowledge to **periodically** observe the condition of the existing populations, to detect any adverse impacts to plants or the population,

and to discover additional populations. Such efforts are in addition to the formal monitoring program.

132. Post signs near the North McKittrick Canyon population.

Signs should be posted which state the ecological sensitivity of the area and encourage individuals not to climb on side slopes of the canyon. Plants are easily dislodged and the impact of individuals climbing the canyon slopes that support McKittrick pennyroyal could be devastating to this population. To reduce the possibility of vandalism or collection, signs should not directly identify the plant or indicate exact localities for populations.

133. Evaluate all future development or land use changes in the steep canyons south of Guadalupe Ridge.

An evaluation of future development of land use changes **south** of Guadalupe Ridge should **consider** not only the direct or primary impact of construction, but also the indirect or secondary impact of increased area use. Any leases or permits for oil and gas exploration or other land use changes in North McKittrick Canyon should stipulate protection of the pennyroyal as one requirement for least **or** permit issuance. If any activities authorized, funded, or carried out by the Forest Service will affect or may affect the pennyroyal population, the Forest Service must



enter into consultation with the FWS under Section 7 of the ESA.

134. Monitor the population **as** described in task 125.

Forest Service personnel should annually monitor the population, noting any adverse impact. If use of North **McKittrick** Canyon increases or if oil and gas exploration occur, a more intense monitoring program should be developed.

135. Evaluate the value of declaring critical **habitat** for this population.

Once the status of this population **is** better known, the value of **declaring** critical habitat should be evaluated. The FWS should propose critical habitat for this **area** if it is determined it will benefit the species.

14. Seek cooperation of the private landowner to protect and maintain the Big Canyon population.

Although populations on **private** land lack the protection **against collecting** given to those on public land, it is important for the survival of the species that **attempts** be made to secure those populations.

141. Increase landowner awareness of **McKittrick** pennyroyal, including location and fragility.

To avoid damaging plants, the landowner should be made aware of their location.

142. Monitor the population as described in task 125.

The U.S. Fish and Wildlife Service or another agency should **annually** monitor the population, noting any adverse effects.

15. Develop a management plan for the population on BLM land in Big Canyon.

One of the largest known populations of **McKittrick** pennyroyal occurs on BLM land in Big Canyon. A management plan should be developed for this population that includes the following:

151. Monitor the population **as** described in task 125.

Personnel from BLM should annually monitor the population. Any adverse impact from erosion caused by seasonal **runoff** water should be noted.

152. Post signs near the population.

Signs which advise of the ecological sensitivity of the area should be posted to minimize the impact to the plants and their habitat. To reduce the possibility of vandalism

or collection, signs should not directly identify the plant or indicate exact localities for populations.

153. Evaluate all future development and land use **changes**.

Such an evaluation should consider not only direct or primary impacts but also indirect impacts of increased area **use**. If any **activities** authorized, funded, or carried out by BLM will affect or may affect this species, the BLM must enter into consultation with the FWS **under** Section 7 of the ESA.

154. Monitor **grazing**.

If overgrazing becomes evident, stocking rates should be lowered or livestock removed until range conditions stabilize or improve. The impact to the habitat due to wild sheep should be monitored. If **sheep** cause habitat deterioration, a reduction program should be implemented.

155. Evaluate the value of declaring critical habitat for this population.

Since 1982 when **McKittrick** pennyroyal was listed and critical habitat declared, three additional populations have been discovered. The population on **BLM** administered land in Big Canyon is one of those newly **discovered** and **is** now one of

the largest populations known. The value of declaring critical habitat for this population should be evaluated and FWS should propose critical habitat for this area if it is determined it will benefit the species.

2. Gather information for use in management of populations.

In order to manage the species effectively and determine criteria for **delisting**, it will be necessary to better understand the distribution, population biology, and ecology of the species.

21. Review population biology and ecology of the species.

In-depth knowledge of the population biology and ecology of **McKittrick** pennyroyal is needed **to** understand its population dynamics and habitat requirements. If appropriate data **is** not available from the **literature**, appropriate **studies** should be conducted. When this information is known it may be used to help manage healthy, natural **populations**.

211. Determine the extent of reproduction by seed and overall reproductive success.

The annual seed yield of H. apiculatum is quite low and no seedlings have been observed in the wild. Undoubtedly some seed reproduction occurs. A study of dispersal mechanisms **as** well as germination and **seedling** requirements should yield valuable data on the requirements for population

establishment and maintenance. Vegetative reproduction should also be examined.

212. Study the soil, climatic, and microhabitat requirements.

Additional knowledge of these factors should aid in **managing** current populations, **locating** new populations, and **choosing** sites for seeding and/or **transplantation** if conditions indicate that the latter measure is necessary for species survival. Integration of this information with task 211 could provide additional insight on the factors required for seed establishment and population growth.

~~213. Search for additional populations.~~

Based on information gathered in task 212, **determine** the **most** likely sites to search for additional populations and investigate those areas for presence of the species.

23. Develop techniques to artificially propagate (from seed or vegetatively) and transplant **H. apiculatum**.

Information gathered under task 211 and 212 can be used to develop techniques to artificially propagate and transplant **H. apiculatum**, if conditions **indicate** that these measures will be necessary for **species** survival.

24. Use information from population studies and from management to establish delisting criteria **for** the species.

An evaluation of the success of management practice<sup>8</sup> and information from population studies will make it possible to establish quantified delisting criteria for the species.

3. Develop public appreciation and support for the preservation of *Hedeoma apiculatum*.

Education of the public **is** a vital part of the recovery process. **The** cooperation of the public is essential for the ultimate success of the foregoing recovery measures.

31. Increase public knowledge of the Endangered Species Program and of **McKittrick** pennyroyal.

Obtain the support of the National Park Service interpretative program and Forest Service public information personnel. **Use** displays, **discussions**, slide shows, and pamphlets to increase public knowledge of the endangered species program and of **McKittrick** pennyroyal.

32. Obtain support of local public interest groups.

Local public interest groups such as native plant **societies**, garden clubs, rotary, etc. , need to be involved. Such o **rganiza-**  
**tions** will expose the general public to the statue of **H. apiculatum** and serve to focus on the problems associated with endangered and threatened plants of the area in general.

Literature Cited

- Brown, **D.E.**, and C.H. Lowe. 1980. Biotic communities of the Southwest. Gen. Tech. Rpt. RM-78, Rocky Mt. **Forest** and Range Exp. Sta., USDA Forest Ser., Fort Collins, Colorado.
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- Hunt, C.B. 1967. Natural regions of the U.S. and Canada. **W.H.** Freeman and Co., San Francisco.
- Irving, R.S. **1980a**. The **systematics** of Hedeoma (Labiataee). Sida **8(3):** 218-295.
- . **1980b**. Statue report on Hedeoma apiculatum. U.S. Fish and Wildlife Service, Office of Endangered Species, Albuquerque, New Mexico.
- Juen, **J.** 1983. Threatened and endangered plants in southeast New Mexico on lands administered by the Bureau of Land **Management**. USDI Bureau of Land **Management**, Roswell District Office, **New Mexico**.
- National Park Service. 1973. Master plan, Guadalupe Mountain<sup>8</sup> National Park. USDI National Park Service, Guadalupe Mountain<sup>8</sup> National Park, Carlsbad, New Mexico.
- . **1984**. Backcountry management plan and **enviromental** assessment for Guadalupe Mountains National Park, Texas. USDI National Park Service, Guadalupe Mountain<sup>8</sup> National Park, **Carlsbad**, New Mexico.

### PART III

#### IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows is a summary of scheduled actions and costs for the McKittrick pennyroyal recovery program. It is a guide to meet the objective of the recovery plan for McKittrick pennyroyal, as elaborated in Part II, Narrative. This schedule indicates the general category for implementation (I = information gathering; M = management; A = acquisition; O = other), recovery plan tasks, corresponding action outline **numbers**, task priorities, duration of tasks ("ongoing" denotes a task that once begun should continue on an annual basis), **which** agencies are responsible to perform these tasks, and lastly, estimated **costs for** FWS tasks. Part III of this plan constitutes the actions, that When accomplished, should bring about the recovery of the threatened McKittrick pennyroyal and protect its habitat. It should be noted that monetary needs for agencies other than FWS are not identified and therefore Part III does not reflect the total financial requirements for the recovery of the species.



General Categories for Implementation Schedule

**Information Gathering - I or R (research)**

1. Population **status**
2. Habitat status
3. Habitat requirements
4. **Management** technique<sup>8</sup>
5. Taxonomic **studies**
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contaminant
13. Reintroduction
14. Other information

**Management - M**

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

**Acquisition - A**

1. Lease
2. **Easement**
3. Management **agreement**
4. Exchange
5. Withdrawal
6. Fee title
7. Other

**Other - O**

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

Recovery Action Priorities

- 1** = an action that must be taken to prevent **extinction** or to prevent the species from **declining** irreversibly.
- 2** = an action that must be taken to prevent a significant decline in **species** population/habitat quality, or **some** other significant negative impact short of extinction.
- 3** all other action<sup>8</sup> necessary to provide for full recovery of the species.

Abbreviations Used

FWS - USDI Fish and **Wildlife** Service  
 SE - Office of Endangered Species  
 LE - Law Enforcement  
 BLM - USDI Bureau of Land Management  
 NPS - USDI National Park Service  
 FS - USDA **Forest** Service

# IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY			FISCAL YEAR COSTS			COMMENTS
					FWS		OTHER	(EST.)*			
					REGION	PROGRAM		FY1	FY2	FY3	
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
02	Enforce regulations.	11	2	ongoing	2	LE SE	BLM IFS NPS	\$ 2,000	\$ 2,000	\$2,000	
M7	Develop management plans.	112,131 15	2	1 year	2	SE	NPS FS BLM	3,000			
M7	Increase park personnel awareness of McKittrick pennyroyal.	121	2	ongoing			NPS				
M3	Complete Hunter Peak Loop.	122	2	2 years			NPS				
01, 03	Post signs.	123 132 152	2	1 year			NPS FS BLM				
M3	Evaluate all future development.	124 133 153	2	ongoing			NPS FS BLM				
M3	Evaluate value of declaring additional critical habitat.	127 135 155	2	ongoing	2	SE	NPS FS BLM	500	500	500	
11	Monitor McKittrick pennyroyal populations.	125 134 142 151	2	ongoing	2	SE	NPS FS BLM	8,000	5,000	5,000	

\*Costs refer to USFWS expenditures only.

# IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY			FISCAL YEAR COSTS			COMMENTS
					FWS	PROGRAM	OTHER	(EST.)*			
					REGION			FY1	FY2	FY3	
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
M7	Protect McKittrick pennyroyal from visitor impact.	126	2	ongoing			NPS				
M7	Increase Forest Service personnel awareness of McKittrick pennyroyal.	131	3	ongoing	2	SE	FS				
M7	Increase land-owner awareness of McKittrick pennyroyal.	141	3	ongoing	2	SE					
M2, M3	Monitor grazing.	154	2	ongoing			BLM				
M13, R6, R13	Review population biology and ecology.	21	2	5 years	2	SE		10,000	5,000	5,000	
M11, M13	Search for additional populations.	22	2	2 years	2	SE		5,000	5,000		
M13, R7	Develop techniques to artificially propagate and transplant.	23	I 3	3 years	2	SE		10,000	5,000	5,000	

\*Costs refer to USFWS Expenditures only.

# IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS			COMMENTS
					FWS		OTHER	(EST.)*			
					REGION	PROGRAM		FY1	FY2	FY3	
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
03	Establish delisting criteria.	24	3	1 year	2	SE				500	
01	Develop public appreciation and support.	3	3	ongoing	2	SE		5,000	1,000	1,000	

\*Costs refer to USFWS expenditures only.

## APPENDIX

### List of Reviewers

An agency draft of the **McKittrick** Pennyroyal Recovery Plan was sent to the following agencies for their review on September 21, 1984:

The Nature Conservancy, Albuquerque, New Mexico  
Secretary, New Mexico Department of Natural Resources  
Director, Texas Natural Heritage Program  
Regional Forester, U.S. Forest Service, Region **3**  
Regional Director, National Park Service, Southwest Region  
Director, Bureau of Land Management, New Mexico State Office  
**Ecologi** Cal **Services**, Fort Worth Field Office, USFWS, Region 2  
Ecological Services, Albuquerque Field Office, USFWS, Region 2  
Division of Wildlife Research, USF'WS, Washington, **D.C.**  
Director (AFA) , USFWS, Washington, D. **C.**

### Comments Received

Letters of comment on this plan have been reproduced in this section and are followed by the responses made to each comment.



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR.  
FISH AND WILDLIFE SERVICE

In Reply Refer To:  
FWS/OES

NOV 28 1984

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CL-12-5

## Memorandum

To: Regional Director, Region 2 (ARD/AFF)  
Acting Associate  
From: Director

Subject: Comments on McKittrick Pennyroyal Recovery Plan - Agency Draft

We have reviewed the subject plan and made comments in the margins of the attached plan. In addition, the following comments should be addressed:

- |              |  |
|--------------|--|
| End. Sp. R-2 |  |
| JOHNSON      |  |
| LANGOVSKI    |  |
| Bowman       |  |
| Burton       |  |
| Carley       |  |
| Halvorsen    |  |
| Hoffman      |  |
| Olwell       |  |
| Stefferd     |  |
| Botanist     |  |
| Hopp         |  |
| Padilla      |  |
| SANCHEZ      |  |
- A-1 1. The plan would benefit by having a picture or diagram of the plant incorporated.
- A-2 2. Page 14 indicates that "seasonal runoff water" is a threat to the Big Canyon population, yet this is never addressed in the Stepdown Outline/Narrative.
- A-3 3. Tasks 132 and 152 call for the posting of signs to alert visitors of the ecological sensitivity of the area. Part I does not indicate that these particular areas are threatened by visitor use. Is the posting of signs justified?, #visitor usage of the area is not a threat, posting could draw unwanted attention to the area.
- A-4 4. Subtasks 212, 22, 23, and 24 are the only places where transplanting/seeding are mentioned as possible future activities. The possibility of establishing new populations should be addressed in a separate task if we are seriously considering it.
- A-5 5. Since the plan states that insufficient data exist to quantify criteria for delisting, an additional task needs to be added to the Stepdown/Narrative to determine the criteria which must be met to consider delisting.

We hope these comments will assist you in preparing the final plan for the Regional Director's approval. Upon such approval, please notify the Office of Endangered Species (OES). Also, provide OES with 30 copies of the approved, printed plan when it is available.

FWS REG 2  
RECEIVED

DEC 4 '84

Attachment

*James R. Fielding*  
J. R. Fielding

3 10

UNITED STATES GOVERNMENT

U.S. FISH &amp; WILDLIFE SERVICE

## Memorandum

TO : Acting Regional Director, FWS, AFF, Albuquerque, NM

DATE:

January 2, 1985

FROM : Field Supervisor, FWS, ES, Albuquerque, NM

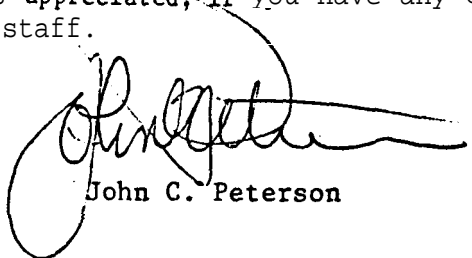
SUBJECT: Review of Agency Review Draft Recovery Plans for McKittrick pennyroyal  
and Todesen's pennyroyal (Mr. Fjetland's 9/21/84 memorandum)

We have reviewed the subject draft plans and have made specific comments in pencil directly on the attached documents.

B-1 In general the plans appear well written. However, we suggest additional clarification is needed regarding Federal Agency compliance with Section regulations. Also, we question the validity of emphasizing the locality and rareness of these endangered plants. This can only increase human interest and result in collection or human use impacts.

B-2

The opportunity to comment is appreciated; if you have any questions please call Joel Medlin of my staff.

  
John C. Peterson

Attachment

cc: &lt;w/d att&gt;

Regional Director, FWS, Habitat Resources, Albuquerque, New Mexico

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FWS-Region 2

JAN 4 1985

AFF

UNITED STATES GOVERNMENT

U.S. FISH & WILDLIFE SERVICE

# Memorandum

JOHNSON	
LANGOVSKI	
Bowman	
Burton	
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Halvorson	
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Steffrud	
Hopp	
Padilla	
SANCHEZ	

TO : Regional Director, FWS, Albuquerque, NM (SE)

DATE: October 26, 1984

FROM : *Ac Fly*  
Field Supervisor, FWS, Ft. Worth, TX (ES)

SUBJECT: Agency Review Draft Recovery Plans for Hedeoma apiculatum and Callirhoe scabriuscula

We have reviewed the subject recovery plans *per* Mr. Fjetland's request in memorandums dated September 21, and October 5, 1984. Our comments are limited to two points that are applicable to any plans where the species in question are in our area of responsibility.

C-1 We believe positive actions to enhance the species should be spelled out in a short, lucid, narrative and included at the beginning of the recovery plan. This narrative should also be included in the "Red Book" when updated. This would provide numerous agencies and organizations with information to include in their project plans. Additionally, these improvements could be suggested by the ES biologist when preparing comments or during the pre-development consultation process on a particular project.

C-3 Secondly, we believe a mechanism is needed for recovery team and ES field station coordination during the recovery plan formulation process. such coordination would oftentimes assist the ES field station during the pre-development consultation process with the action agency(s).

*David A. Carter*

REG 2  
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OCT 29 '84  
SE





United States  
Department of  
Agriculture

Forest  
Service

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Region 3

517 Gold Avenue, SW  
Albuquerque, NM 87102

St

End. Sp. R-2	
<input checked="" type="checkbox"/>	JOHNSON
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Reply, To: 2670

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CL-10-291

Date: OCT 25 1984

Regional Director  
U.S. Fish and Wildlife Service  
P.O. Box 1306  
Albuquerque, NM 87 103

Dear Mr. Spear:

As requested in your September 21, 1984, letter, we have evaluated the agency review draft of the recovery plan for Hedeoma apiculatum. Our comments remain much as they were for the technical review draft.

D-1 Dr. Irving cites a collection of Hedeoma aoiculatum by Dr. Northington on the Lincoln National Forest above a roadway near 1758 meters elevation in North McKittrick Canyon. We still need the location of this population in order to monitor and safeguard it. There is no roadway near this elevation in North McKittrick Canyon.

D-2 We have encountered a few scattered Hedeoma aoiculatum plants in Big and Black Canyons. These plants are in remote and extremely inaccessible sites, both to recreationists and livestock. Hedeoma aoiculatum is considered in the evaluation of all Forest projects and the plant is being included in the Forest planning process. There is a high level of awareness toward Hedeoma apiculatum at both the District and Forest levels.

D-4 It is unclear in the plan at which **point** Hedeoma apiculatum can be delisted. If the goals set forth in the plan are reached, can the plant be delisted? A clear statement regarding the point of complete or adequate recovery is needed.

D-5 Since no critical habitat and few Hedeoma aoiculatum plants occur on the Lincoln National Forest, our role in recovering the species is minor; however, we fully support the recovery of the species and will continue in our attempts to locate new populations.

Sincerely,

*Marlin Q. Hughes*  
JAMES C. OVERBAY  
Deputy Regional Forester

cc:  
Forest Supervisor, Lincoln National Forest

OCT 29 1984





# United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
NEW MEXICO STATE OFFICE  
P.O. BOX 1449  
Santa Fe, New Mexico 87504-1449

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JOHNSON		
LANGOWSKI		
Bowman	IN REPLY REFER TO	
Burton	6840	(931)
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Halvorson		RD
Hickman		DRD
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Steffen		AF
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Padilla		LE
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## Memorandum

To: Regional Director, Region 2, FWS, Albuquerque, NM

From: Deputy State Director, Lands and Renewable Resources, BLM  
Santa Fe, NM

Subject: **McKittrick** Pennyroyal Draft Recovery Plan

We have reviewed the subject recovery plan and have no comments.

We are aware that this plant occurs on public lands administered by our agency, E-1 and we will continue to cooperate with the Fish and Wildlife Service in this effort.

Thank you for the opportunity to review the subject plan.

*David A. Jones*

FWS REG 2  
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REC'D  
FWS-Region 2

NOV 13 1984

Responses to Comments

A-1 Suggestion was incorporated.

A-2 Suggestion was incorporated.

A-3 Signs will not directly identify the plant or indicate exact localities for populations. Even though **visi** tor use in areas outside the park is not considered a threat, signs will still provide a helpful warning to agency or other personnel working **near McKi** t trick pennyroyal popula t **ions**.

A-4 These sections have been revised. New populations will only be established if management indicates this measure is necessary for species survival.

A-5 Suggestion was incorporated as aubtask 24 of the Step-down Outline.

B-1 Suggestion was incorporated

**B-2** Public support for protection and recovery of this species can only be achieved if the public is sufficiently aware of the plant's rarity. Due to the possibility of collecting or vandalism, specific locations are not given in this plan and any warning signs placed in the field will be posted in a manner that does not indicate the exact locality of any known populations.

C-1 A summary briefly outlining recovery goals, recovery criteria, and actions needed has been included at the beginning of the plan.

C-2 Comment noted.

C-3 Comment noted.

D-1 **Comment** noted.

D-2 Comment noted.

D-3 Comment noted.

**D-4** An evaluation of the success of management practices and information from population biology and ecology studies are needed to establish quantified delisting criteria. Once this information is available, **delisting** criteria will be established. This has been included as a specific task in the plan.

D-5 **Comment** noted.

E-1 Comment noted.